

REMARKS

In response to the Official Action mailed April 14, 2003, Applicants amend their application and request reconsideration. In this Amendment, claims 7, 10, 12, and 16 are cancelled leaving claims 1-6, 8, 9, 11, 13-15, and 17-20 pending.

The Examiner indicated in the Official Action that claims 21 and 22 were withdrawn from consideration. In fact, those claims have been cancelled.

Some clarifying amendments are made here. The term "nano-particles" is adopted so that there is no confusion between those particles which are magnetic, particularly superparamagnetic, and those particles that are diamagnetic. The limitation of claim 7 appears in amended claim 1 so that claim 7 is cancelled, necessitating a change in the dependency of claim 8. Claim 10 is cancelled as redundant in view of the amendment of claims 1 and 8. Claim 12 is cancelled as duplicative of amended claim 9. Claim 16 is cancelled because its limitation is incorporated into amended claim 13. Minor formatting errors in claims 13 and 18 are corrected.

The amended independent claims describe the maximum dimension of the paramagnetic nano-particles. This description is supported in the patent application by Table 2 at page 9. In addition, it is specified that the particles are superparamagnetic. This characteristic is important in achieving the objective of the invention, namely producing a material with a reduced dielectric constant. See the patent application at page 7, lines 14-17. Examples of superparamagnetic materials are described at page 5, lines 16-19 and part of line 20. It is known in the art that superparamagnetic means that the particles have no permanent dipoles and, therefore, an ideal magnetic property. Ferromagnetic materials have strong permanent dipoles. Paramagnetic magnetic materials have weak permanent dipoles. Since superparamagnetic materials have no permanent dipoles, they are magnetized far more easily by an externally applied magnetic field than are paramagnetic and ferromagnetic materials. Likewise, the absence of permanent dipoles means that an externally applied electric field is more effective in altering superparamagnetic materials than altering ferromagnetic or paramagnetic materials. The latter consideration is important to an objective of the invention, i.e., providing a lowered dielectric constant material.

Claims 1-20 were rejected as unpatentable over a complex combination of publications. Apparently, the Examiner proposed to combine Holl (Published U.S. Patent Application 2002/0038582), Sato et al. (U.S. Patent 6,232,777, hereinafter Sato), Ohtaki (U.S. Patent 6,063,303), Saitoh et al. (U.S. Patent 4,734,708, hereinafter Saitoh),

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Wegman (U.S. Patent 5,699,842), and Papisov et al. (U.S. Patent 5,582,172, hereinafter Papisov). This rejection is respectfully traversed.

As a first matter, if the Examiner intends to make Holl of record in this patent application, then a new PTO-892 Form should be issued. It does not appear that that publication has ever been recorded on such a form in the prosecution of this patent application.

In applying the cited publications to the claims, the Examiner repeatedly used the term "nano-particles" without reference to any dimensions as if any particle fits this definition. This view is incorrect and can no longer be employed. The size of the particles that qualify as nano-particles according to the invention is now clearly specified in the claims.

Holl cannot be properly applied in rejecting any pending claim. Even the Examiner acknowledges that the size of the particles described by Holl is 0.1-50 μm which, in the units that apply to the patent application, is a size range from 100 nm to 50,000 nm. Holl clearly teaches nothing about nano-particles. Further, Holl teaches nothing about superparamagnetic particles of any size. Holl is directed to the manufacture of printed circuit boards and is concerned with the mechanical strength of those circuit boards. Some vague reference is made in Holl to incorporating within those circuit boards electromagnetic materials or metal magnetic material particles. There are no examples whatsoever in Holl as to what particles are being referred to. Thus, Holl fails to disclose essentially anything relevant to the invention claimed, i.e., nothing about nano-particles and nothing about superparamagnetic particles. Since Holl is the primary reference, the entire rejection collapses with respect to all claims now pending upon the withdrawal of Holl, which is now required.

Sato was cited as describing a composite including a dielectric matrix containing nano-particles with a dimension of 6 nm and dispersed throughout the matrix. The characterization of Sato as describing a matrix with particles "dispersed throughout the matrix" is, at best, illogical, as described in the previous response. Sato describes several magnetic detectors, every one of which includes only a mono layer of particles having a diameter having of 6 nm. The Examiner's attention is directed to page 6 of the previous Amendment pointing out that only a single layer of particles is employed in the magnetic sensor described at columns 5 and 6 of the Sato. The other passage of Sato, the one cited by the Examiner, at columns 7 and 8, describes a layer having a thickness of 8 nm in which particles having a diameter of 6 nm are "dispersed". It is apparent that it is impossible to have more than a single layer of the particles in that arrangement. To

suggest that those descriptions describe particles dispersed "throughout" a matrix is simply not reasonable. Moreover, it is not reasonable to suggest that Sato could teach anything about a structure, as in the independent claims, in which the matrix has a thickness at least 1,000 times the maximum dimension of the nano-particles. For these reasons, Sato should be withdrawn as a reference.

Even if the Examiner insists that Holl and Sato are pertinent prior art, no one of skill in whatever is the relevant art would ever find a suggestion for modifying Holl with Sato. Holl concerns the fabrication from various organic materials of printed circuit boards that have adequate mechanical strength. Sato is directed to a magnetic field detector. The subject matter of these two disclosures is so different that one of skill in the art would never seek to modify one with the other. The objective of Holl is to provide a printed circuit board in which a powdered filler is bonded in a matrix of a polymer to produce a composite material. The objective of Sato is to alter the impedance of a magnetoresistive sensor. These two publications have no relationship to each other and it is doubtful that they are even analogous prior art to each other. Thus, it is inappropriate in the rejection to seek to modify Holl with Sato.

Ohtaki was relied upon as suggesting the combination of non-spherical nano-particles with spherical nano-particles. Even if, for the sake of argument, it is accepted that Ohtaki discloses this limitation, and it is accepted that Holl, Sato, and Ohtaki can be combined, no combination of these references could include all the elements of the independent claims, claims 1, 13, and 18. Therefore, the hypothetical combination cannot suggest the invention.

Moreover, the proposition for which Ohtaki was cited is not pertinent to the claimed invention. Ohtaki teaches the formation of resin coated magnetic particles in non-spherical shapes. Manufacturing such particles may be a requirement for producing the structures defined by claims 3, 14, and 19, but the existence of such particles does not suggest their inclusion in the claimed composite materials. The Examiner has not cited any suggestion for that incorporation. Moreover, Ohtaki is directed to particles used in magnetic recording and those particles are ferrites. It would be contrary to common knowledge to employ superparamagnetic materials in magnetic recording. This difference between Ohtaki and the invention as defined by the independent claims confirms that Ohtaki lacks a suggestion for modifying the purported combination of Holl and Sato. Thus, the rejection of claims 2, 3, 14, and 19, if founded upon Ohtaki, is unsound and cannot be properly maintained.

Saitoh was cited as describing nano-particles of $\gamma\text{-Fe}_2\text{O}_3$. Applicants agree that there is a reference to that material in column 10 of Saitoh, a patent that relates to the formation, transfer, and printing of magnetic latent images. Saitoh never makes reference to or discloses the size of the magnetic particles referred to in column 10 as dispersed within an organic material. The functioning of that material has no dependency upon dielectric constant. Rather, the function, as described in Saitoh, is entirely dependent upon magnetic fields and the interaction of the materials at different temperatures. Therefore, contrary to the assertion at page 4 of the Official Action, Saitoh includes no suggestion for modifying the asserted combination of Holl and Sato to produce the structure defined by claim 11. Claim 6, also referred to in the same rejection, is clearly patentable as depending from a patentable claim.

Claims 8 and 17 were further rejected, based upon the earlier hypothetical combinations of references, further in view of Wegman. Claims 8 and 17 make reference to including diamagnetic nano-particles in combination with superparamagnetic nano-particles in a matrix. Again, the Examiner errs in referring to Wegman and other references as if they discussed nano-particles. Wegman does not discuss particles of such small size. Rather, Wegman is concerned with filling a container with magnetic particles. Wegman quite naturally describes the apparatus that is the subject of his patent as being able to handle any kind of magnetic particles, including mixtures of magnetic, paramagnetic, superparamagnetic, and diamagnetic particles. The fact that this filling apparatus can process such mixtures of different kinds of magnetic particles has no relationship whatever to the claimed invention. Wegman is irrelevant and the rejection of claims 6 and 17 cannot be properly maintained.

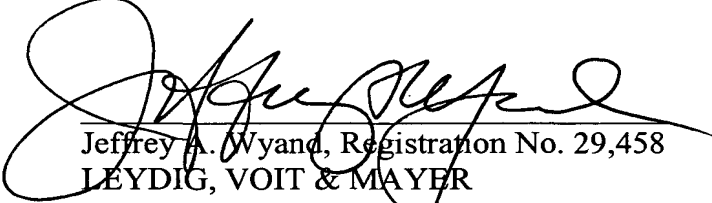
Finally, with respect to claim 9, the Examiner attempted to rely upon Papisov. This rejection does not need response because Papisov is clearly irrelevant non-analogous prior art. That patent relates to delivery of agents for diagnostic and therapeutic purposes to the lymphatic system of an animal. There is nothing similar in the field of the present invention and the field of Papisov. In addition, the problems sought to be solved in the invention and in Papisov are totally unrelated. Therefore, Papisov is not analogous prior art to the invention and cannot even be applied in rejecting any pending claim. MPEP 2141.01(a).

Applicants note that there are no specific comments in the Official Action with regard to examined claims 2, 4, 5, 7, 12, 15, 16, 19, and 20. While these claims were not identified as allowable, it is apparent that not even the Examiner found the limitations of these claims were not found in the prior art relied upon in the rejections of other claims.

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Amended claim 1 incorporates the limitation of claim 7, amended claim 13 incorporates the limitation of claim 16, and amended claim 18 incorporates the limitation that appeared in claims 7 and 16. Accordingly, the implicit concession with regard to the prior art and the subject matter of the amended independent claims demonstrates that the three independent amended claims now pending distinguish from the prior art. Therefore, upon reconsideration, all claims now pending should be promptly allowed.

Respectfully submitted,



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Date: July 14, 2003
JAW:ves



In re Application of: PARK et al.
 Application No. 09/839,594
 Filed: April 23, 2001
 For: LOW DIELECTRIC COMPOSITE WITH NANO MAGNETIC PARTICLES, AND OPTICAL DEVICE USING THE LOW DIELECTRIC COMPOSITE

Mail Stop Non-Fee Amendment
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Sir:

Transmitted herewith is a response to an office action in the subject application.

- ☐ Applicants claim small entity status of this application under 37 CFR 1.27.
- ☒ Petition for Extension of Time
☐ Applicants petition for a one-month extension of time under 37 CFR 1.136, the fee for which is \$110.00 (enclosed).
☒ Applicants believe that no petition for an extension of time is necessary. However, to the extent that such petition is deemed necessary, Applicants hereby petition for a sufficient extension of time to render the present submission timely. Please charge Deposit Account No. 12-1216 for the appropriate petition fee.

☒ No additional claim fee is required.

☐ Other:

The claim fee has been calculated as shown below:

					SMALL ENTITY		OTHER THAN A SMALL ENTITY		
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	EXTRA CLAIMS PRESENT	RATE	ADDIT. CLAIM FEE	RATE	ADDIT. CLAIM FEE
TOTAL			MINUS		=	x 9=	\$	x 18=	\$
INDEPENDENT			MINUS		=	x 42=	\$	x 84=	\$
<input type="checkbox"/>	FIRST PRESENTATION OF MULTIPLE CLAIM					+ 140=	\$	+ 280=	\$
						TOTAL	\$	TOTAL	\$

- ☐ Please charge my Deposit Account No. 12-1216 in the amount of \$. A duplicate copy of this sheet is attached.
- ☐ A check in the amount of \$ is attached.
- ☒ The Commissioner is hereby authorized to charge any deficiencies in the following fees associated with this communication or credit any overpayment to Deposit Account No. 12-1216. A duplicate copy of this sheet is attached.
☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.
☒ Any patent application processing fees under 37 CFR 1.17.

Respectfully submitted,

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Date: *July 14, 2003*
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